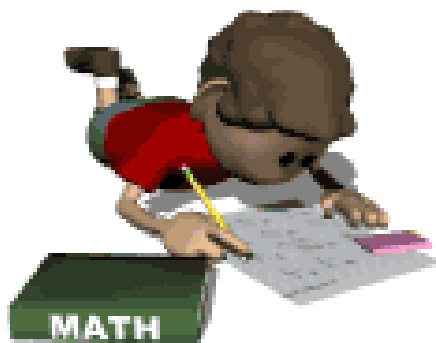


NOTE TO STUDENT

*This Spring Student Enrichment Packet has been compiled to complement high school mathematics classroom instruction aligned to Maryland College and Career Ready Standards (MCCRS). It is intended to be used for **review and practice** of previously taught and new concepts.*

We strongly encourage you to work diligently to complete the activities in this packet. You may experience some difficulty with some problems in this packet, but we encourage you to explore and attempt to find a solution to the best of your ability.



1. What is the solution of the system of the linear equations?

$$\begin{cases} 2x + 3y - z = 16 \\ -3x + 3y + z = 20 \end{cases}$$

Enter your answers in the boxes.

$$x = \boxed{}, y = \boxed{}, z = \boxed{}$$

2. The functions $f(x)$ and $g(x)$ are defined below.

$$f(x) = -x + 3$$

$$g(x) = \frac{1}{3}(x^2 - 9)$$

The graphs of $y = f(x)$ and $y = g(x)$ intersect at point P and Q .

Determine the x-coordinates of P and Q . Select all that apply.

- ☐ -6
- ☐ -3
- ☐ 0
- ☐ 3
- ☐ 6
- ☐ 9

3. Every month, a company increases its sales by twice the previous month. The company experienced 14 sales in January, 28 sales in February, 56 sales in March, and so on. If this pattern continues, how many total sales will the company have made after 9 months?
- A. 3,570
 - B. 3,584
 - C. 7,154
 - D. 14,322

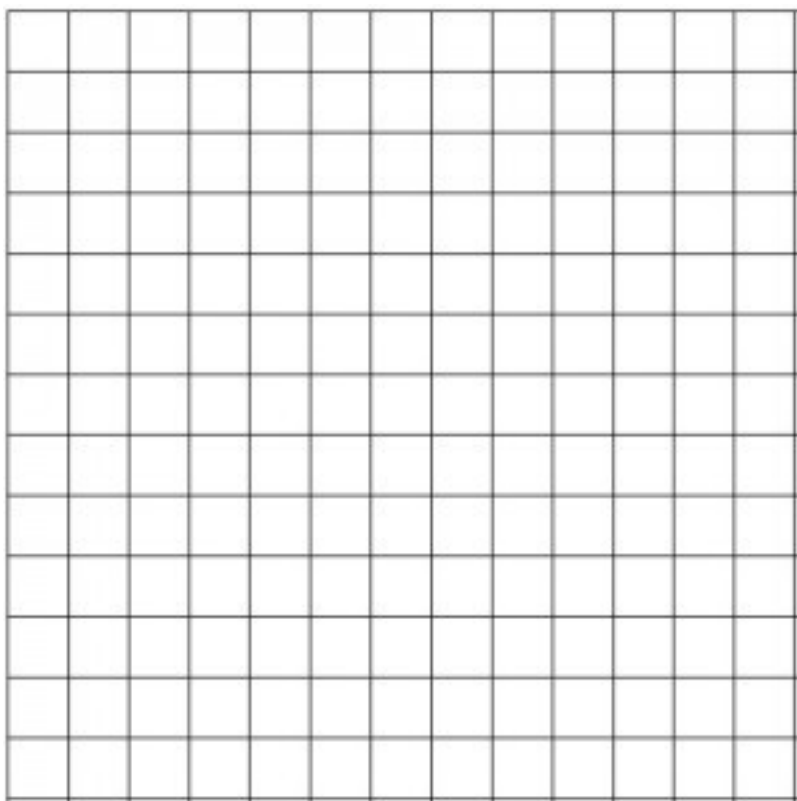
4. A swimming pool is being filled up with water. The amount of water in the pool after x minutes can be determined by the following equation.

$$W(x) = 2\sqrt{7x+25}$$

If the amount of water in the pool is approximately 21.54 ft^3 , then approximately how many minutes has the water been filling up the pool?

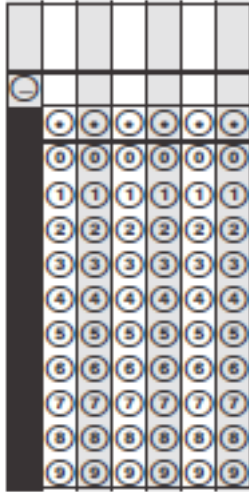
- A. 6.5
- B. 13
- C. 26
- D. 84.5

5. Graph $y = 3\cos(4x)$.



6. A fisherman illegally introduces fish into a lake, and they quickly populate. The growth of the population of this new species (within a period of a few years) is modeled by $P(x) = 5b^x$, where x is the time in weeks following the introduction and b is a positive unknown base.

After 8 weeks, the lake contained 33 fish. Find the value of b . Round to the nearest hundredth.



7. The table below shows the number of households in the U.S. in the years 1998 – 2004.

year	1998	1999	2000	2001	2002	2003	2004
households (in thousands)	97,107	98,990	99,627	101,018	102,528	103,874	104,705

- Write a linear function, h , which models the number of households in the U.S. (in thousands) as a function of the year, t .
- Write an expression for $h^{-1}(t)$.

8. For items a through e, determine whether each equation is **True** or **False**.

a. $\sqrt{32} = 2^{\frac{5}{2}}$

☐ True

☐ False

b. $16^{\frac{3}{2}} = 8^2$

☐ True

☐ False

c. $4^{\frac{1}{2}} = \sqrt[3]{64}$

☐ True

☐ False

d. $2^8 = (\sqrt[3]{16})^6$

☐ True

☐ False

e. $(\sqrt{64})^{\frac{1}{3}} = 8^{\frac{1}{6}}$

☐ True

☐ False

9. Which equation does not have a solution?

A. $\sqrt{x-1}+3=4$

B. $\sqrt{x+1}+3=4$

C. $\sqrt{x-2}+7=10$

D. $\sqrt{x+2}+7=-10$

10. Which function rule fits the data in the table?

x	0	1	2	3	5	10
y	5	15	45	135	1,215	295,245

A. $y=3^x+5$

B. $y=5 \cdot 3^x$

C. $y=3 \cdot 5^x$

D. $y=3x+5$

11. A Ferris wheel sits on a platform 10 feet above the ground. The length of each "arm" is 100 feet. The Ferris wheel makes a complete revolution counterclockwise every 3 minutes.

Assume a particular car starts at the platform when time is 0. Which of the following is a function that models the height of this car with respect to time?

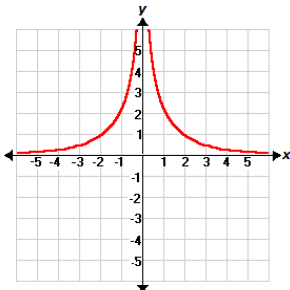
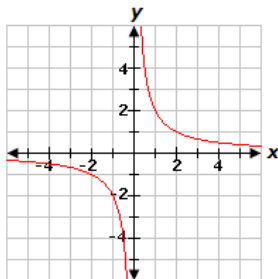
A. $y = 100 \sin(3x) + 110$

B. $y = 100 \sin\left(\frac{2\pi}{3}(x - 0.75)\right) + 110$

C. $y = 100 \sin\left(\frac{2\pi}{3}x\right) + 100$

D. $y = 100 \sin\left(\frac{3}{2\pi}x\right) + 110$

12. Determine whether each function is an even function, an odd function, both, or neither. Select the correct answer.

	A. Even	B. Odd	C. Both	D. Neither
$f(x) = \frac{x^2 - 28}{x^3 + x}$	0	0	0	0
	0	0	0	0
$f(x) = e^{2x} + e^{-2x}$	0	0	0	0
	0	0	0	0

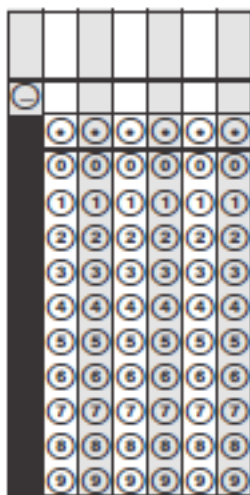
13. Asia was doing an experiment for her chemistry class. She found that the further an object gets from the earth's surface, the less that object weighs. She discovered that in order to find the weight of an object, $W(m)$, m miles above sea level, she must multiply the weight of the object at sea level by the quotient of the radius of the earth, 3,963 miles, and $(m + 3,963)$.

Asia weighs 133 pounds at sea level, and she wants to know how much she would weigh at different distances from the earth's surface.

The table below models the situation above.

m	100	200	300	400	500	600
$W(m)$	129.73	126.61	123.64	120.81	118.1	115.51

Using the table, determine the approximate average rate of change from 300 miles above sea level to 500 miles above sea level?



14. Tina throws a ball upward from a height of 2 feet. She came up with the following table to represent the height of the ball at seconds after it was thrown.

t	0	1	2	3	4
$h(t)$	2	16.7	21.6	16.7	2

What is the maximum height of the ball?

- A. 16.7 feet
- B. 21.6 feet
- C. 22 feet
- D. More information is needed to solve this problem.

15. Graph $y=2^x-3$.

